

*Handwritten Markings:*  
Claims:

1. An electro-modulating device (10) comprising a  
5 modulating element (14), the modulating element (14)  
having a modulating medium (16) for modulating light  
passing therethrough, an optical input-output surface (21)  
by which light both enters the medium (16) prior to  
modulation of the light and exits the medium (16) after  
10 modulation of the light, a light reflector (28), and  
electrodes (15,17) for applying an electric field across  
the modulating medium (16), wherein:

the input-output surface (21), the medium (16) and the  
15 reflector (28) are arranged so that light enters the  
medium through the input-output surface (21), travels  
through the medium (16) towards the reflector (28), is  
reflected by the reflector (28) to travel back through the  
medium (16) towards the input-output surface (21), and  
20 exits the medium through the input-output surface (21);

the electric field is transverse to the direction of  
propagation of light traversing the medium (16) between  
the input-output surface and the reflector (28); and  
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the refractive index of the medium (16) is responsive to  
the applied electric field so that the intensity and/or  
phase of the light exiting the input-output surface (21)  
is dependent on the applied electric field.

30 2. An electro-modulating device (10) as claimed in Claim

1, wherein the modulating element (14) is formed from a section of semiconductor wafer (40,15,16,17) and the modulating medium (16) is formed from an active layer (16) on or in the semiconductor wafer, the active layer (16) having a plurality of edges (20,22) and the input-output surface (21) residing on an edge (20) of the active layer.

3. An electro-modulating device (10) as claimed in Claim 2, wherein the modulating medium (16) is an active layer situated between a first layer of conducting semiconductor (15) and a second layer (17) of conducting semiconductor, the first and second layers of conducting semiconductor forming the electrodes (15,17) for applying a bias across the modulating medium (16).

15 4. An electro-modulating device (10) as claimed in Claim 2 or Claim 3, wherein the electro-modulating device (10) has a mounting surface (41) on which there is mounted the modulating element (14).

20 5. An electro-modulating device (10) as claimed in Claim 4, wherein the mounting surface (41) has securing means (43) for securing the end portion (11) of an optic fibre (12) such that light from the fibre (12) can be coupled 25 into and out of the modulating medium (16) through the input-output surface (21).

6. An electro-modulating device (10) as claimed in Claim 5, wherein the mounting surface (41) is formed from a 30 silicon substrate having a V-groove (42) etched thereon for receiving the end portion (11) of an optic fibre (12).

7. An electro-modulating device (10) as claimed in any one of Claims 4 to 6, wherein the mounting surface has a light guide (52a,52b) formed thereon for guiding light into and 5 out of the modulating element (14).
8. An electro-modulating device (10) as claimed in Claim 7, wherein the light guide (52a) and modulating medium (16b) are formed from a continuous layer of semiconductor 10 (16).
9. An electro-modulating device (10) as claimed in any previous claim wherein the modulating element (14) has at least one end wall (22) and the reflector (28) is formed 15 by at least one layer of reflective material (26) deposited on the end wall (22) of the modulator element.
10. An electro-modulating device (10) as claimed in any of Claims 2 to 9, wherein the modulating medium (16) is 20 formed from a layer of InGaAsP, and each electrode is formed from a layer of conducting InP.